

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (currently amended): A method for locating an  
2 object of interest, the method comprising:  
3 a) accepting at an observation point, signals  
4 emanating from the object;  
5 b) determining, for each of the accepted signals, ~~at~~  
6 ~~least one of (A) an associated time of arrival, (B) an~~  
7 ~~amplitude, and (C) a direction of arrival;~~  
8 c) determining at least two trace-back rays from the  
9 observation point using solely the direction of  
10 arrival of signals and topographical information; and  
11 d) determining at least one candidate location  
12 ~~locations~~ at crossings of two or more trace-back rays;  
13 ~~e) determining a set of final candidate locations~~  
14 ~~from the determined candidate locations; and~~  
15 ~~f) determining the location of the object of interest~~  
16 ~~using the set of final candidate locations.~~

1 Claim 2 (original): The method of claim 1 wherein the act  
2 accepting at an observation point, signals emanating from  
3 the object, includes screening the signals using a physical  
4 characteristic of the signals.

1 Claim 3 (original): The method of claim 1 wherein the act  
2 accepting at an observation point, signals emanating from  
3 the object, includes screening the signals using a bandpass  
4 frequency filter.

1 Claim 4 (original): The method of claim 1 wherein the act  
2 accepting at an observation point, signals emanating from

3 the object, includes screening the signals using a signal  
4 amplitude threshold.

1 Claim 5 (original): The method of claim 1 wherein the act  
2 accepting at an observation point, signals emanating from  
3 the object, includes screening the signals using a  
4 signal-to-noise threshold.

1 Claim 6 (original): The method of claim 1 wherein the act  
2 accepting at an observation point, signals emanating from  
3 the object, includes screening the signals using an angle  
4 of arrival threshold.

1 Claim 7 (original): The method of claim 1 wherein the act  
2 accepting at an observation point, signals emanating from  
3 the object, includes screening the signals using a relative  
4 time of arrival threshold.

1 Claim 8 (original): The method of claim 1 wherein the act  
2 accepting at an observation point, signals emanating from  
3 the object, includes screening the signal using information  
4 carried by the signals.

1 Claim 9 (original): The method of claim 1 wherein the act  
2 of accepting at an observation point, signals emanating  
3 from the object, includes screening the signal using a  
4 unique identifier carried by the signals and associated  
5 with the object.

1 Claim 10 (original): The method of claim 1 wherein the act  
2 accepting at an observation point, signals emanating from  
3 the object, includes screening the signal using both (A) a

4 physical characteristic of the signals, and (B) information  
5 carried by the signals.

1 Claim 11 (currently amended): The method of claim 1  
2 further comprising ~~wherein the act of~~ determining, for each  
3 of the accepted signals, ~~at least one of (A) an associated~~  
4 ~~time of arrival, (B) an amplitude, and (C) a direction of~~  
5 ~~arrival, includes determining all of (A) an associated time~~  
6 ~~of arrival, and (B) an amplitude, and (C) a direction of~~  
7 ~~arrival.~~

1 Claim 12 (original): The method of claim 1 wherein the  
2 topographical information includes sources of signal  
3 reflection.

1 Claim 13 (original): The method of claim 1 wherein the  
2 topographical information includes sources of signal  
3 diffraction.

1 Claim 14 (original): The method of claim 1 wherein the  
2 topographical information includes building surfaces.

1 Claim 15 (original): The method of claim 1 wherein the  
2 topographical information includes signal attenuation  
3 information.

1 Claim 16 (currently amended): The method of claim 54 ~~1~~  
2 wherein the act of determining a set of final candidate  
3 locations from the determined candidate locations includes  
4 eliminating at least some of the candidate locations using  
5 ~~the~~ times of arrival associated with the signals from which  
6 trace-back rays were determined.

1 Claim 17 (original): The method of claim 16 wherein a  
2 candidate location is eliminated if the times of arrival  
3 are inconsistent with expected times of arrival.

1 Claim 18 (original): The method of claim 17 wherein a time  
2 of arrival is determined to be inconsistent with an  
3 expected time of arrival if they differ by more than a  
4 threshold difference.

1 Claim 19 (currently amended): The method of claim 54 ~~1~~  
2 wherein the act of determining a set of final candidate  
3 locations from the determined candidate locations includes  
4 eliminating at least some of the candidate locations using  
5 ~~the~~ amplitudes associated with the signals from which  
6 trace-back rays were determined.

1 Claim 20 (original): The method of claim 19 wherein a  
2 candidate location is eliminated if the amplitudes are  
3 inconsistent with expected amplitudes.

1 Claim 21 (original): The method of claim 19 wherein an  
2 amplitude is determined to be inconsistent with an expected  
3 amplitude if they differ by more than a threshold  
4 difference.

1 Claim 22 (currently amended): The method of claim 54 ~~1~~  
2 wherein the act of determining a set of final candidate  
3 locations from the determined candidate locations includes  
4 eliminating at least some of the candidate locations using  
5 both ~~the~~ times of arrival and ~~the~~ amplitudes associated

6 with the signals from which trace-back rays were  
7 determined.

1 Claim 23 (currently amended): The method of claim 54 ±  
2 wherein the act of determining a set of final candidate  
3 locations from the determined candidate locations includes  
4 i) determining if ~~the~~ times of arrival of each  
5 of the accepted signals are inconsistent with  
6 expected times of arrival;  
7 ii) if it was determined that the times of  
8 arrival are inconsistent with expected times of  
9 arrival, then excluding the candidate location  
10 from the set of final candidate locations; and  
11 iii) if it was determined that the times of  
12 arrival are not inconsistent with expected times  
13 of arrival, then  
14 A) determining if ~~the~~ amplitudes of each of  
15 the accepted signals are inconsistent with  
16 expected amplitudes, and  
17 B) if it was determined that the amplitudes  
18 are inconsistent with expected amplitudes,  
19 then excluding the candidate location from  
20 the set of final candidate locations.

1 Claim 24 (currently amended): The method of claim 54 ±  
2 wherein the act of determining the location of the object  
3 of interest using the set of final candidate locations  
4 includes  
5 i) defining an area of accuracy including at  
6 least one candidate location from the set of  
7 final candidate locations, and

8           ii) determining the location of the object of  
9           interest using the defined area of accuracy.

1   Claim 25 (original): The method of claim 24 wherein the  
2   area of accuracy is a circle of accuracy.

1   Claim 26 (original): The method of claim 24 wherein at  
2   least two areas of accuracy are defined, and  
3       wherein the act of determining the location of the  
4   object of interest uses a cardinality of each of the areas  
5   of accuracy.

1   Claim 27 (original): The method of claim 24 wherein at  
2   least two areas of accuracy are defined, and  
3       wherein the act of determining the location of the  
4   object of interest includes  
5       A) defining at least one cluster, each cluster  
6       including locations of each of at least two areas  
7       of accuracy, and  
8       B) determining the location of the object of  
9       interest using the at least one cluster.

1   Claim 28 (original): The method of claim 27 wherein the  
2   act of determining the location of the object of interest  
3   uses a location of the at least one cluster.

1   Claim 29 (original): The method of claim 27 wherein at  
2   least two clusters are defined, each of the at least two  
3   clusters having an associated diameter and  
4       wherein the act of determining the location of the  
5   object of interest uses the diameter of each of the at  
6   least two clusters.

1 Claim 30 (original): The method of claim 27 wherein at  
2 least two clusters are defined, each of the at least two  
3 clusters having an associated cluster cardinality, and  
4 wherein the act of determining the location of the  
5 object of interest uses the cluster cardinality of each of  
6 the at least two clusters.

1 Claim 31 (original): The method of claim 27 wherein at  
2 least two clusters are defined, each of the at least two  
3 clusters having both an associated diameter and an  
4 associated cluster cardinality, and  
5 wherein the act of determining the location of the  
6 object of interest uses the cluster cardinality and the  
7 diameter of each of the at least two clusters.

1 Claim 32 (original): The method of claim 27 wherein at  
2 least two clusters are defined, each of the at least two  
3 clusters having  
4 - associated areas of accuracy, each of the  
5 associated areas of accuracy having a cardinality,  
6 - an associated diameter, and  
7 - an associated cluster cardinality, and  
8 wherein the act of determining the location of the  
9 object of interest uses  
10 - the cardinalities of the areas of accuracy  
11 associated with each of the at least two clusters,  
12 - the diameters associated with each of the at least  
13 two clusters, and  
14 - the cluster cardinalities associated with each of  
15 the at least two clusters.

1 Claim 33 (currently amended): The method of claim 54 ±  
2 wherein the act of determining the location of the object  
3 of interest using the set of final candidate locations  
4 includes  
5           i) defining a volume of accuracy including at  
6           least one candidate location from the set of  
7           final candidate locations, and  
8           ii) determining the location of the object of  
9           interest using the defined volume of accuracy.

1 Claim 34 (original): The method of claim 33 wherein the  
2 volume of accuracy is a sphere of accuracy.

1 Claim 35 (original): The method of claim 33 wherein at  
2 least two volumes of accuracy are defined, and  
3       wherein the act of determining the location of the  
4 object of interest uses a cardinality of each of the  
5 volumes of accuracy.

1 Claim 36 (original): The method of claim 33 wherein at  
2 least two volumes of accuracy are defined, and  
3       wherein the act of determining the location of the  
4 object of interest includes  
5           A) defining at least one cluster, each cluster  
6           including locations of each of at least two  
7           volumes of accuracy, and  
8           B) determining the location of the object of  
9           interest using the at least one cluster.

1 Claim 37 (original): The method of claim 36 wherein the  
2 act of determining the location of the object of interest  
3 uses a location of the at least one cluster.



1 Claim 38 (original): The method of claim 36 wherein at  
2 least two clusters are defined, each of the at least two  
3 clusters having an associated diameter and  
4 wherein the act of determining the location of the  
5 object of interest uses the diameter of each of the at  
6 least two clusters.

1 Claim 39 (original): The method of claim 36 wherein at  
2 least two clusters are defined, each of the at least two  
3 clusters having an associated cluster cardinality, and  
4 wherein the act of determining the location of the  
5 object of interest uses the cluster cardinality of each of  
6 the at least two clusters.

1 Claim 40 (original): The method of claim 36 wherein at  
2 least two clusters are defined, each of the at least two  
3 clusters having both an associated diameter and an  
4 associated cluster cardinality, and  
5 wherein the act of determining the location of the  
6 object of interest uses the cluster cardinality and the  
7 diameter of each of the at least two clusters.

1 Claim 41 (original): The method of claim 36 wherein at  
2 least two clusters are defined, each of the at least two  
3 clusters having  
4 - associated volumes of accuracy, each of the  
5 associated volumes of accuracy having a cardinality,  
6 - an associated diameter, and  
7 - an associated cluster cardinality, and  
8 wherein the act of determining the location of the  
9 object of interest uses

10       - the cardinalities of the volumes of accuracy  
11       associated with each of the at least two clusters,  
12       - the diameters associated with each of the at least  
13       two clusters, and  
14 the cluster cardinalities associated with each of the at  
15 least two clusters

1 Claim 42 (currently amended): Apparatus for locating an  
2 object of interest, the apparatus comprising:

3       a) an input for accepting at an observation point,  
4       signals emanating from the object;  
5       b) means for determining, for each of the accepted  
6       signals, ~~at least one of (A) an associated time of~~  
7       ~~arrival, (B) an amplitude, and (C) a~~ a direction of  
8       arrival;  
9       c) means for determining at least two trace-back rays  
10      from the observation point using solely the direction  
11      of arrival of signals and topographical information;  
12      and  
13      d) means for determining at least one candidate  
14      location ~~locations~~ at crossings of two or more  
15      trace-back rays;  
16      ~~e) means for determining a set of final candidate~~  
17      ~~locations from the determined candidate locations; and~~  
18      ~~f) means for determining the location of the object~~  
19      ~~of interest using the set of final candidate~~  
20      ~~locations.~~

1 Claim 43 (currently amended): The apparatus of claim 42  
2 further comprising ~~wherein the~~ means for determining, for  
3 each of the accepted signals, at least one of (A) an

4 associated time of arrival, and (B) an amplitude, ~~and (C) a~~  
5 ~~direction of arrival~~.

1 Claim 44 (original): The apparatus of claim 42 wherein the  
2 topographical information includes sources of signal  
3 reflection.

1 Claim 45 (original): The apparatus of claim 42 wherein the  
2 topographical information includes sources of signal  
3 diffraction.

1 Claim 46 (original): The apparatus of claim 42 wherein the  
2 topographical information includes building surfaces.

1 Claim 47 (original): The apparatus of claim 42 wherein the  
2 topographical information includes signal attenuation  
3 information.

1 Claim 48 (currently amended): The apparatus of claim 55 ~~42~~  
2 wherein the means for determining a set of final candidate  
3 locations from the determined candidate locations include  
4 means for eliminating at least some of the candidate  
5 locations using ~~the~~ times of arrival associated with the  
6 signals from which trace-back rays were determined.

1 Claim 49 (currently amended): The apparatus of claim 55 ~~42~~  
2 wherein the means for determining a set of final candidate  
3 locations from the determined candidate locations include  
4 means for eliminating at least some of the candidate  
5 locations using ~~the~~ amplitudes associated with the signals  
6 from which trace-back rays were determined.

1 Claim 50 (currently amended): The apparatus of claim 55 ~~42~~  
2 wherein the means for determining a set of final candidate  
3 locations from the determined candidate locations include  
4 means for eliminating at least some of the candidate  
5 locations using both ~~the~~ times of arrival and ~~the~~  
6 amplitudes associated with the signals from which  
7 trace-back rays were determined.

1 Claim 51 (currently amended): The apparatus of claim 55 ~~42~~  
2 wherein the means for determining a set of final candidate  
3 locations from the determined candidate locations includes  
4 means for  
5 i) determining if ~~the~~ times of arrival of each  
6 of the accepted signals are inconsistent with  
7 expected times of arrival;  
8 ii) if it was determined that the times of  
9 arrival are inconsistent with expected times of  
10 arrival, then excluding the candidate location  
11 from the set of final candidate locations; and  
12 iii) if it was determined that the times of  
13 arrival are not inconsistent with expected times  
14 of arrival, then  
15 A) determining if ~~the~~ amplitudes of each of  
16 the accepted signals are inconsistent with  
17 expected amplitudes, and  
18 B) if it was determined that the amplitudes  
19 are inconsistent with expected amplitudes,  
20 then excluding the candidate location from  
21 the set of final candidate locations.

1 Claim 52 (currently amended): The apparatus of claim 55 ~~42~~  
2 wherein the means for determining the location of the

3 object of interest using the set of final candidate  
4 locations include means for  
5 i) defining an area of accuracy including at  
6 least one candidate location from the set of  
7 final candidate locations, and  
8 ii) determining the location of the object of  
9 interest using the defined area of accuracy.

1 Claim 53 (currently amended): The apparatus of claim 55 ~~42~~  
2 wherein the means for determining the location of the  
3 object of interest using the set of final candidate  
4 locations include means for  
5 i) defining a volume of accuracy including at  
6 least one candidate location from the set of  
7 final candidate locations, and  
8 ii) determining the location of the object of  
9 interest using the defined volume of accuracy.

1 Claim 54 (new): The method of claim 1 wherein the act of  
2 determining determined at least two candidate locations,  
3 the method further comprising:  
4 e) determining a set of final candidate locations  
5 from the determined candidate locations; and  
6 f) determining the location of the object of interest  
7 using the set of final candidate locations.

1 Claim 55 (new): The apparatus of claim 42 wherein the  
2 means for determining determined at least two candidate  
3 locations, the apparatus further comprising:  
4 e) means for determining a set of final candidate  
5 locations from the determined candidate locations; and

6        f) means for determining the location of the object  
7        of interest using the set of final candidate  
8        locations.